



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
10.10.2001 Bulletin 2001/41

(51) Int Cl.7: **H04L 5/02**

(43) Date of publication A2:
19.05.1999 Bulletin 1999/20

(21) Application number: **98309092.9**

(22) Date of filing: **06.11.1998**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
 Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Dyke, Peter John**
Saffron Walden, Essex CB11 13SP (GB)

(74) Representative: **Bewley, Ewan Stuart et al**
Nortel Networks
Intellectual Property Law Group
London Road
Harlow, Essex CM17 9NA (GB)

(30) Priority: **14.11.1997 US 969886**

(71) Applicant: **Nortel Networks Limited**
Montreal, Quebec H2Y 3Y4 (CA)

(54) **Method and apparatus for reducing cross talk using line coding**

(57) To accommodate the overlay of broadband information over narrowband signals while reducing cross-talk in upstream and downstream directions, different baseband line codes are used to modulate respective upstream and downstream transmissions on a common wireline communication resource, such as a twisted copper-pair. In this way, filtering components located at each end of a connection can reject cross-talk based upon dissimilar signal characteristics that arise between wanted broadband signals having a first baseband line code and spectrally-shifted cross-talk emanating from interfering broadband signals having a different baseband line code.

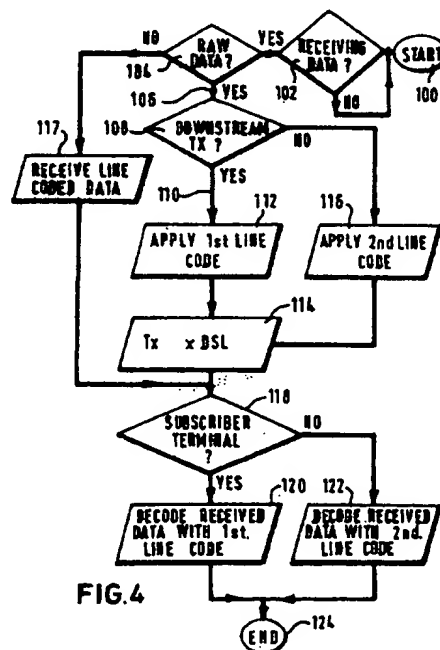


FIG. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 30 9092

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 680 394 A (TONG PO ET AL) 21 October 1997 (1997-10-21) * abstract; claims 1,5,6,11-13,20; figure 6 * * column 1, line 39 - line 61 * * column 2, line 9 - line 26 * * column 3, line 8 - line 21 * * column 3, line 28 - line 35 * * column 5, line 24 - line 44 * * column 7, line 43 - line 67 * * column 8, line 48 - column 9, line 11 * ---	1-30	H04L5/02
X	US 5 515 378 A (OTTERSTEN BJORN ET AL) 7 May 1996 (1996-05-07) * column 1, line 18 - line 47 * * column 7, line 27 - line 32 * * column 9, line 15 - line 31 * * column 9, line 43 - column 10, line 10 * * column 24, line 62 - column 25, line 7; claims 3,4,7 * ---	1-30	
X	WO 97 06619 A (TELIA AB ; ISAKSSON MIKAEL (SE)) 20 February 1997 (1997-02-20) * abstract; claims 1,2,4,7 * * page 1, line 10 - line 19 * * page 2, line 28 - line 38 * * page 3, line 25 - line 32 * * page 4, line 27 - line 30 * * page 6, line 2 - line 11 * * page 6, line 31 - page 7, line 7 * --- -/--	1-30	TECHNICAL FIELDS SEARCHED (Int.Cl.6) H04L
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 15 August 2001	Examiner Binger, B
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P4/C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 30 9092

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB 2 311 196 A (NORTHERN TELECOM LTD) 17 September 1997 (1997-09-17) * abstract; claims 1-3,5,7; figure 3 * * page 1, line 11 - page 2, line 9 * * page 3, line 20 - page 4, line 16 * * page 5, line 31 - page 6, line 11 * * page 7, line 17 - line 33 * * page 9, line 1 - line 10 * -----	1-30	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 15 August 2001	Examiner Binger, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 CL 62 (PO-C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 9092

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-08-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5680394 A	21-10-1997	AU 720576 B	08-06-2000
		AU 6478296 A	10-02-1997
		CN 1190511 A	12-08-1998
		EP 0838109 A	29-04-1998
		JP 11509062 T	03-08-1999
		WO 9703506 A	30-01-1997
		US 5838667 A	17-11-1998
US 5515378 A	07-05-1996	AT 183865 T	15-09-1999
		AU 670766 B	01-08-1996
		AU 3145493 A	19-07-1993
		CA 2125571 A	24-06-1993
		DE 69229876 D	30-09-1999
		DE 69229876 T	30-12-1999
		EP 0616742 A	28-09-1994
		EP 0926916 A	30-06-1999
		ES 2137197 T	16-12-1999
		FI 942771 A	10-06-1994
		JP 7505017 T	01-06-1995
		WO 9312590 A	24-06-1993
		WO 9818272 A	30-04-1998
		US 5546090 A	13-08-1996
		US 5625880 A	29-04-1997
		US 5592490 A	07-01-1997
		US 5642353 A	24-06-1997
		US 5828658 A	27-10-1998
WO 9706619 A	20-02-1997	EP 0883944 A	16-12-1998
		SE 9502775 A	05-02-1997
GB 2311196 A	17-09-1997	EP 0886926 A	30-12-1998
		WO 9735399 A	25-09-1997
		JP 2000512443 T	19-09-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82